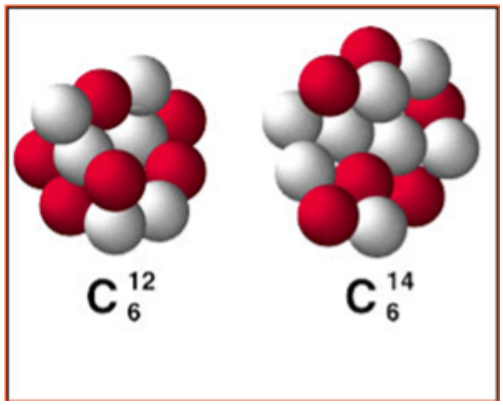
Element	Symbol	Atomic #	Protons	Neutrons	Mass #
Boron-11	B	5	5	6	11
Carbon -12	C	6	6	6	12
Magnesium-23	Mg	12	12	11	23
Copper-64	Cu	29	29	35	64
Calcium-40	Ca	20	20	20	40

$^{11}_{5}B$ $^{12}_{6}C$ $^{23}_{12}Mg$ $^{64}_{29}Cu$



Isotope:
atoms of the same element with different numbers of neutrons

$^{12}_{6}C$ $^{14}_{6}C$

6 neutrons 8 neutrons

#1 #2 #3 #4

^{234}X ^{234}X ^{235}X ^{238}X

92 93 92 92

Np

All Uranium

142 neutrons 143 neutrons 146 neutrons

mass # → $^{12}_{6}C$ atomic # →

	neutrons
$^{12}_{6}C$	6
$^{13}_{6}C$	7
$^{14}_{6}C$	8

Naturally occurring carbon consists of three isotopes, ^{14}N, ^{15}N, and ^{16}N.
State the number of protons, neutrons, and electrons in each of these carbon atoms.

	$^{14}_{7}N$	$^{15}_{7}N$	$^{16}_{7}N$
#P	7	7	7
#N	7	8	9
#E	7	7	7

] neutral atoms

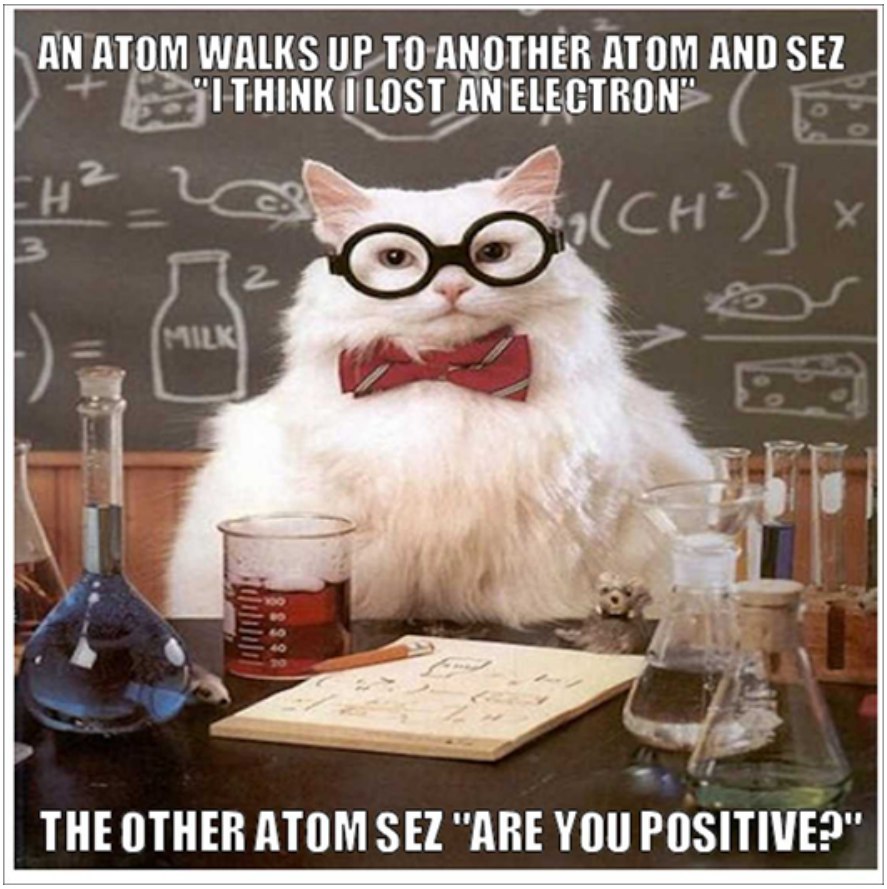
same # of protons as electrons

Ions:

- Charged atoms (or groups of atoms) that have a net positive or net negative charge
- "Net" means difference between two things
- Ions differ by the number of electrons
- Neutral atoms → # protons = # electrons
  - Examples → Na, Ca, I, O
- Ions → # protons ≠ # electrons
  - Examples → Na^{+}, Ca^{2+}, I^{-}, O^{2-}
- If you take away an electron(s), the atom becomes net positive. There are more protons than electrons.
- If the atom is net positive, we call it a <u>cation</u>.
- If an atom gains electron(s), the atom becomes net negative. This means there are more electrons than protons.
- If the atom is net negative, we call it an <u>anion</u>.

- Examples:

	$^{39}_{19}K^{+}$	$^{16}_{8}O^{2-}$	$^{41}_{20}Ca^{2+}$
$\#p^+$	19	8	20
$\#n^0$	20	8	21
$\#e^-$	18	10	18


AN ATOM WALKS UP TO ANOTHER ATOM AND SEZ
"I THINK I LOST AN ELECTRON"
MILK
THE OTHER ATOM SEZ "ARE YOU POSITIVE?"